UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,718	07/20/2005	James Timothy Cronin	CH2883USPCT	2991

7590 12/24/2009

Jessica M Sinnott
E I du Pont de Nemours and Company
Legal Patent
4417 Lancaster Pike
Wilmington, DE 19805

EXAMINER	
NGUYEN, NGOC YEN M	
ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
12/24/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/539,718	CRONIN ET AL.	
	Examiner	Art Unit	
	Ngoc-Yen M. Nguyen	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on September 25, 2009 has been entered.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 12-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no sufficient support in the instant specification for the limitation “the crude titanium tetrachloride discharge being free of aluminum passivating agent” as now required in the instant claim 12. Applicants stated that support for this limitation can be found at page 4, lines 15-16 and line 31 to page 5, line 19, however, on these pages

and lines numbers, the specification only discloses that the vanadium passivating agent may be mixed into the discharge before the aluminum passivating agent is mixed into the discharge. Even if aluminum passivating agent is required to be added after adding the vanadium passivating agent in the instant process, this still not clearly teaches that the crude titanium tetrachloride discharge is being free of aluminum passivating agent, i.e. before any step of adding passivating agent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art (the preamble of the Jepson claim 12) or GB 744,074, either one in view of Cronin (Cronin '182, 2001/0016182) and optionally further in view of Robinson (4,246,022)

The admitted prior art, i.e. the preamble of the Jepson claim 12, discloses a process for purifying a crude titanium tetrachloride chlorinator discharge comprising titanium tetrachloride, aluminum chloride and vanadium chlorides, by mixing a vanadium passivating agent selected from the group consisting of organic oil into the chlorinator discharge to form a passivated discharge comprising one or more easy-to-separate vanadium-containing compounds.

The limitation "the crude titanium tetrachloride discharge being free of aluminum passivating agent" is listed in the preamble of the Jepson claim 12, thus, it is considered as being admitted as old.

Alternatively, GB '074 discloses a process for purifying crude titanium chloride to remove a major portion of the impurities therefrom which comprises refluxing the crude titanium tetrachloride in the presence of animal waxes (note claim 1). The impurities in the crude titanium tetrachloride include, for example, vanadium, silica, aluminum, niobium and tungsten (note page 2, lines 25-29). GB '074 teaches that for economical reasons a minimum amount of animal wax for effecting "substantially complete", which fairly suggests that the vanadium is not completely eliminated, purification of the crude titanium tetrachloride is preferred (note page 2, lines 109-112).

For the "crude titanium tetrachloride discharge being free of aluminum passivating agent" as now required, it is considered to require the addition of a passivating agent that can remove aluminum impurity. It should be noted that such limitation does not exclude the step of adding an aluminum passivating agent before adding the vanadium passivating agent.

For the use a particular oil or animal fat, it would have been obvious to one of ordinary skill in the art to have selected a known and conventional oil or animal fat in the art to effectively remove the impurities, especially vanadium and/or aluminum from titanium tetrachloride through routine experimentation.

The difference is the admitted prior art or GB '074 does not disclose the step of adding an aluminum passivating agent which is selected from the group consisting of water, water containing solutions, water containing mixtures, and carboxylic acids.

However, in both the admitted prior art and GB '074, it is disclosed that the titanium tetrachloride contains chloride impurities such as chlorides of aluminum, vanadium, etc. (note: preamble of claim 12 and GB '074, page 1, lines 35-42) and the processes disclosed in the admitted prior art only disclose the removal of vanadium impurities.

Cronin '182 teaches that aluminum chloride present in the crude titanium tetrachloride is a highly corrosive material. It both quickly and severely attacks the metal materials of construction in the purification systems (note paragraph [0002]). The real-time control loop combined with the location of the addition of the passivating agent minimizes both the losses of titanium value from titanium tetrachloride reaction with excess concentrations of passivating agent and losses of service time from corrosion equipment and the formation of unwanted deposits (note paragraph [0039]).

Cronin '182 discloses an in-process, real-time control loop capable of controlling the passivation of aluminum chloride formed in the chlorination of titanium-containing ores by monitoring titanium oxychloride present in passivated crude titanium tetrachloride comprising the steps: (a) rapidly mixing into a chlorinator discharge stream, where the stream comprises predominately vapor in the presence of liquid mist and solids, an aluminum chloride-passivating agent to form in the process stream an essentially non-corrosive aluminum containing compound, and titanium oxychloride; (b)

measuring in-process the concentration of titanium oxychloride in the chlorinator discharge stream or in the crude titanium tetrachloride; (c) comparing the measured concentration of titanium oxychloride to that of an aim point concentration of titanium oxychloride; and (d) adjusting the rate of addition of the aluminum chloride-passivating agent to restore or maintain the concentration of titanium oxychloride at the aim point (note claim 1).

Cronin '182 teaches that the presence of titanium oxychloride in the process stream indicates that the aluminum chloride has been passivated (note paragraph [0031]) and the formation of titanium oxychloride represents a loss of titanium value (note paragraph [0032]). Thus, it would have been obvious to one skilled in the art to have verified the presence of aluminum impurity in the titanium tetrachloride stream before adding the aluminum passivating agent in order prevent losing titanium value. Cronin '182 also discloses that the probe or detector may be located in the immediate vicinity of (which can be immediately before or immediately after) the addition point for the aluminum chloride passivating agent or downstream and its actual location is not critical as long as it is located in an area where the titanium oxychloride will be in solution (note paragraph [0034]).

For the combined teaching of the applied references, the vanadium passivating agent and the aluminum passivating agent can be added to the crude titanium tetrachloride simultaneously to obtain a vanadium- and aluminum-passivated discharge, which is considered the same as the claimed "passivated discharge". It would have been obvious to one skilled in the art to have monitored the titanium oxychloride

discharge to maintain the concentration of titanium oxychloride at the aim point. Thus, titanium oxychloride would always have been detected, and no additional aluminum passivating agent is needed to be mixed with the passivated discharge (note "if titanium oxychloride is absent" language in the instant claim 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have removed aluminum chloride impurity from the admitted prior art or GB '074 by using the process of Cronin '182 in order to have minimized both the losses of titanium and losses of service time from corrosion equipment that was caused by the aluminum chloride impurity. It would have been obvious to one skilled in the art to have carried out the process of Cronin '182 before, after or during the process of the admitted prior art or GB '074, as long as the advantages as stated above can be achieved.

Optionally, Robinson '022 can be applied to teach that titanium tetrachloride can be purified by treating with mineral oil, a mineral oil sludge residue often containing aluminum chloride, niobium chloride and vanadium chloride thereby being produced (note column 1, lines 38-43). Thus, Robinson '022 clearly teaches that the mineral oil can remove both vanadium and aluminum impurities from titanium tetrachloride.

Claims 12-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kay et al (Kay '881, 2,600,881) in view of Frey et al (Frey '021, 2,592,021) and Cronin '182.

Kay '881 discloses a process for the removal of aluminum chloride in solution with liquid titanium tetrachloride which comprises mixing with said liquid an amount of water sufficient only to react with the active aluminum chloride to be removed therefrom, and then separating the titanium tetrachloride from the resulting aluminum fluoride complex (note claim 1) by distillation (note claim 2).

Kay '881 teaches that the use of excess water is undesirable because loss of titanium values will occur due to formation of titanium oxychloride and the like (note column 5, lines 31-36). Kay '881 further teaches that besides the aluminum chloride impurity, the titanium tetrachloride contains other impurities such as vanadium (note table in column 6 and Example I). After the aluminum chloride is removed, the titanium tetrachloride is subjected to another purification step to remove color-imparting impurities such as a chloride of vanadium (note column 6, lines 30-35).

For the limitation "the crude titanium tetrachloride discharge being free of aluminum passivating agent", note the reasons as stated in the above rejection.

The differences are Kay '881 (1) does not disclose the use of an oil or animal fat to remove vanadium and (2) the step of monitoring the presence of titanium oxychloride in order to decide the addition of the aluminum passivating agent and (3) Kay '881 does not disclose the step of removing vanadium before the step of removing aluminum.

For (1), Frey '021 discloses a process for removing coloring impurities from titanium tetrachloride comprises intermixing said chloride and a small proportion of an organic compound selected from the group consisting of hydrocarbons and compounds of carbon, hydrogen and at least one substituent from the group consisting of hydroxyl,

oxy, keto, amino, and carboxyl radicals, heating said organic compound in the titanium tetrachloride to cause said compound to carbonizes therein and said impurities are taken up by said carbonization product, and separating purified titanium tetrachloride from said carbonization product holding said impurities (note claim 1 and Example 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further have removed the vanadium impurity from the titanium tetrachloride of Kay '881 by using a known and conventional process as suggested by Frey '021 because such process would have provided an easy and cheap way of removing vanadium impurity from titanium tetrachloride (note Frey '021, column 2, lines 5-17).

For (2) Cronin '182 is applied as stated above to teach the in-process, real time control loop for the process of removing aluminum chloride from titanium tetrachloride to prevent the losses of titanium and the losses of service time from corrosion of equipment and the formation of unwanted deposits.

For (3), for the order of removing Al, V, see Ex parte Rubin , 128 USPQ 440 (Bd. App. 1959) (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render prima facie obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results.)

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner can normally be reached on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/
Primary Examiner, Art Unit 1793

nmn
December 24, 2009